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Satellite
Broadcasting
Corporation

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May 1, 1996

BY HAND DELIVERY

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W.
Room 222
Washington, D.C.

Re: DSBC

MAY 2 1996

*Rec'd by Repasi
FCC
Repasi, Chiara, Repasi, Caldwell, et al.*

Re: Ex Parte Presentation in IB Docket No. 95-91; Gen. Docket No. 90-357; RM No. 8610 --
Digital Audio Radio Services

Dear Mr. Caton:

On April 22, 1996, William Caldwell, President of Digital Satellite Broadcasting Corporation ("DSBC"), Angela Wu, consultant to DSBC, Melvin Barmat, consulting engineer to DSBC, and I met with Rosalee Chiara and Ronald Repasi, of the International Bureau, to discuss the Digital Audio Radio service generally and the status of Commission activity in the above-referenced docket, and Canadian coordination issues. During the course of the meetings we discussed data and issues already reflected in DSBC's written comments in this proceeding. In addition, the attached materials were distributed and discussed. These materials were previously forwarded to the International Bureau, at its request, to assist in international coordination efforts in the 2310-2360 MHz band.

Two copies of this letter are being submitted for inclusion in the file.

Sincerely,

Douglas J. Minster
Vice President, Business Affairs
Counsel to DSBC

cc: Rosalee Chiara
Ronald Repasi

OJZ

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April 10, 1996

Mr. Ron Repasi
FCC
2000 M Street, N.W.
Room 510
Washington, DC 20554

Ron
Dar Mr. Repasi:

The attached memo is in response to your February 16 letter to Doug Minster regarding DSBC interference into Canadian co-frequency systems. Based on our analyses we are very confident that U.S. DARS systems can successfully coordinate their planned use of the 2310-2360 MHz band with Canadian use of the band.

Sincerely,



Melvin Barmat

cc: Douglas Minster
(w. attachments)

**Comments on DSBC Interference Into
Canadian Co-Frequency Services**

**4/9/96
(Rev.1)**

1. Introduction

The purpose of this memo and the attached analysis is to respond to the Canadian provided documentation containing data, comments, conclusions and analyses regarding the interference assessment of the DSBC spacecraft into Canadian services, i.e., Fixed Service (FS) and Mobile Aeronautical Telemetry (MAT). In general, we find the calculational methodology of the FS analysis in the Canadian documents appropriate but that some aspects of the data are uncertain, and a few of the assumptions regarding the DSBC System reflect an incomplete understanding. Thus, the Canadian conclusions regarding FS sharing are questionable. In addition, we find that the interference scenarios used in the Canadian analyses concerning MAT to be inappropriate, thereby yielding erroneous conclusions. However, in order to obtain definitive coordination results, additional information regarding MAT operations is required.

2. Summary and Recommendations

2.1 Summary of Sharing with the Canadian FS System

One observation of the Canadian documentation is that the current FS network does not occupy the upper portion of the 2310 to 2360 MHz band. This is not surprising because the Canadian MAT service includes frequency assignments from 2330 MHz and up. A co-frequency transmitter of an airborne test vehicle has the potential

to cause destructive interference to FS stations over a wide area. Because there appears to be some overlap of FS and MAT frequency assignments, it would appear that there are aspects of their utilization that have not been fully divulged.

Of the FS stations identified, over 75% of them occupied the band 2310-2320 MHz. There are no FS stations employing frequencies above 2348.25 MHz and only seven stations have center frequencies above 2330.75 MHz. Unfortunately, the data provided regarding the FS stations did not include information on the sidelobe gain characteristics of the individual antennas.

When the DSBC interference level into the Canadian FS systems is adjusted for realistic DSBC parameters, and station by station calculations are reviewed, several methods of frequency sharing become possible. The basis for this conclusion is discussed in paragraph 3 below. Moreover, since the satellite EIRPs of the other U.S. DARS applicants are somewhat lower than that of DSBC, it would seem that those DARS systems will also be able to share the spectrum with the Canadian FS networks.

The necessary analysis adjustments to the Canadian FS study are few but significant. First, unlike the other U.S. DARS systems, the DSBC system has only one orbital satellite (at 101 degrees West longitude). Therefore, additional interference from a second satellite is not present. Second, the CONUS and spot beams will not be additive on Canadian territory because of careful spectrum planning. Moreover, the sidelobe attenuation of the DSBC spot beams is aggressive. Only four spot beams are near the

Canadian border. The location and frequency of these beams can be adjusted to achieve an acceptable level of interference. Third, the CONUS beam diminishes (in EIRP level) away from the U.S.-Canada border. Fourth, the FS antenna will partially see the Earth, thereby increasing the thermal noise at the receiver input, which was not considered in the Canadian analysis.

Sharing with many existing FS stations with Envelope (sidelobe) B antennas is possible. If the remaining FS stations used Envelope A antennas, sharing with all existing Canadian stations is possible by all U.S. DARS applicants.

Because of their lower EIRP, the other U.S. DARS applicants should be able to share frequencies with most of the Canadian FS systems using either Envelope A or B antennas.

2.2 Recommendations For DSBC Sharing with the Canadian FS System

The discussion below is based on two pessimistic assumptions. One is that all the Canadian FS stations utilize antennas with the worst (Envelope B) antennas. The second is that 0 dB would be a satisfactory I/N limit for each FS receiver. When Canada provides information on the type of antenna used at each FS receiver, the conclusions and recommendations could well lead to more liberal sharing conditions.

The best sharing scenario is for the U.S. to employ a band plan whereby DSBC would not occupy the lower 40% of the 2310-2360 band. As Canada increases its occupancy of the upper band, sharing would continue to be possible through the employment of

better FS antennas, i.e. Envelope A standards or better, and/or siting considerations to obtain appropriate boresite vector separation. The other proposed U.S. DARS systems use PFD levels several dB lower than DSBC. These systems should be able to co-frequency share with the existing Canadian FS systems.

Another alternative is to substitute better antennas at all stations with unacceptable interference within the band assigned to DSBC. Of course, the U.S. DARS applicants would have to pay for such changes. New installations would continue to need better antennas and/or siting.

2.3 Summary of Sharing with the Canadian MAT System

We assume that the performance objective of the Canadian MAT Systems is to correctly receive the telemetry data for a very large portion of the flight time. It would appear that this can be accomplished under all scenarios. The telemetry links generally have sufficient margin to account for up to 30 dB nulls in the aircraft antenna pattern¹.

Except for a small cone around the boresight vector between the MAT terrestrial station and DARS satellite, the test vehicle is in the sidelobe of the DARS satellite CONUS antenna. Test planning could always assure adequate sidelobe attenuation. Moreover, the potential for test vehicle to operationally be in the

¹ THRESHOLD LEVELS FOR DETERMINING THE NEED TO COORDINATE BETWEEN THE BROADCASTING-SATELLITE SERVICE (DSB) USING SATELLITES IN THE GEOSTATIONARY AND HIGHLY ELLIPTICAL ORBITS AND TELEMETRY STATIONS IN THE AERONAUTICAL MOBILE SERVICE IN THE BANDS 1452-1492 MHz AND 3210-2360 MHz, ITU-R, RADIocommunication STUDY GROUPS, Document 202/TEMP/88-E, 6 December 1944, para. 2.1.

satellite-MAT receiver boresight is small because of the elevation angle of the MAT receiver to the GSO satellite.

2.4 Recommendation for Sharing with the Canadian MAT System

It would appear that tracking is always possible with reduced data availability in only a very small portion of the operational time of the test vehicle. However, further study and detailed knowledge of the MAT operations are needed in order to propose definitive coordination techniques. Nevertheless, it appears almost certain that a combination of interference mitigation techniques and interference-cognizant MAT operational methods could be implemented to preclude harmful interference from DARS satellites.

3. US Satellite DSBC - Canadian FS at 2.3 GHz

A detailed interference link budget is presented in Table 2. This follows the format and values from Table 4 of the Canadian paper, except for the use of DSBC parameters and the noise figure of the terminal of the radio relay receiver was increased to reflect the noise temperature of its antenna. The result is a reference I/N of 2.6 dB for the CONUS beam only. The location and frequency assignment of the DSBC spot beams can be configured to have negligible interference effect on Canadian territory.

The Canadian documents included a list of their FS stations in the 2310-2360 MHz band along with some characteristics for each of the stations. This table was used as the basis for calculating the I/N ratio² for each station. However, the

² See Attachment A.

Canadian list did not include information on the sidelobe characteristics of the FS antenna for each station. Therefore, we calculated the I/N for three different antenna qualities for each station. The results are presented in Table 3 of this report. The three types of antenna sidelobes were Envelope A and B of the Canadian documents and an FSS, 29-25 log θ, antenna.

3.1 Observations from the data in Table 3

The following observations from the data in Table 3 can be made:

- Currently there are no identified stations in the upper portion of the 2310-2360 MHz band. There are only seven stations with frequencies above 2330.75 MHz,
- Sharing with all existing stations is possible if Envelope A antennas were used,
- Sharing with some existing stations with Exhibit B antennas is possible,
- Angles between FS boresite and the satellite vector vary between 32.2 and 129.4 degrees, and
- Reorienting of the antennas (billboards, dog legs) may lower the interference by increasing the off-boresite vector to some existing stations.

4. Discussion of the DSBC interference into the Canadian MAT System

The performance objective of a Mobile Aeronautical Telemetry (MAT) system is to correctly receive telemetry data. In the cases of Canadian MAT systems, this can be accomplished under

all scenarios with the possible exception of rare occurrences when the test vehicle enters a small cone around the MAT antenna to DARS satellite vector, assuming that the CONUS beam of the satellite and the telemetry employ the same frequencies. The telemetry link will have sufficient margin to account for 30 dB nulls in the aircraft transmit antenna pattern³.

The effect of interference on these margins and subsequently on the availability of the data will be briefly examined below. Fundamentally, the availability of the data is a function of $C/(N+I)$. Reduction of $C/(N+I)$ increases the probability that the data will be below an non-availability value. For example, in a terrestrial microwave circuit, the path loss will be larger than free space by 30 dB for only 0.1 percent of the time. However, a totally different effect is caused by nulls in the target vehicle antenna pattern. This effect will not be examined here. Suffice it to say that an increase in interference will decrease the null depth yet leave the null width the same, i.e. the null is truncated.

Before the analysis of interference into the Canadian MAT system begins, a few comments are worthwhile:

The Canadian documents do not include an MAT link budget, geographical coordinates of the MAT stations, nor a description of operational methods. All these data are required in order to appropriately address the frequency sharing issue. In order to progress the work, we developed our own version of a link budget

³ Ibid.

(see Table 4) and were able to locate five of the eight MAT locations having frequency assignments in the 2310-2360 MHz band. (A summary of these assignments is in Table 5.)

The first three locations listed in Table 5 are strung North-South along 600 km of the Alberta/Saskatchewan border. It would seem likely that these stations were sited to track vehicles on a North-South flight path. Thus, with proper flight planning, it would seem reasonable that telemetry coverage could be arranged to avoid pointing to the South, where U.S. DARS interference would lurk. The other two "found" locations, Petawawa and Gagetown were surprisingly close to population centers and/or the U.S./Canada border. It would seem that vehicle flight paths for these stations would be to the North, away from population centers nearer the border. While the geographic location of the "Inside Passage" station was not determined, from its name it would most likely serve to track vehicles out to sea, i.e., the West from British Columbia. Thus, this station would also be an unlikely recipient of high level DARS interference.

Table 4

Hypothetical Canadian MAT Link Budget

Power (5W)	7 dBW
Transmit Ant. Gain	3 dB
Path Loss (400 km)	153.3 dB
Receive Ant. Gain	36 dB
Boltzman K	228.6
Receive N.Temp (145°K)	21.6 dBK (high elevation)
<u>Bandwidth (1.0 MHz)</u>	<u>60 dB Hz</u>
C/N	39.7 dB

The extremely high C/N for the MAT link is to allow margin for the unusual occasion when a deep gain-null in the airborne antenna and/or for multipath fading when operating at very low elevation angles. Thus, the off-boresight interference will not cause significantly degraded performance under normal circumstances. Only when the transmitting antenna null⁴ and a severe interference event occur simultaneously will degraded performance be observed. Further study and detailed knowledge of the MAT operations are needed in order to propose definitive coordination techniques.

However, it appears highly likely that a combination of interference mitigation techniques and interference - cognizant MAT operational methods could be implemented to preclude harmful interference from DARS satellites.

⁴ Based on current information, there is almost no likelihood of a multipath fade and a severe interference event because the DSBC satellite is at a high elevation angle to the Canadian MAT locations.

Table 2 Interference from US DSBC Satellite into CANADIAN FS Stations

FACTOR	CONUS	SPOT	UNITS
Power per channel =	19.0	3.0	dBW/(8.3/7.5) MHz
Losses =	-1.3	-1.7	dB
Satellite Antenna Gain =	30.3	47.4	dBi
EIRP per channel =	48.0	48.7	dBW/channel
Number of channels (16) =	12.0	12.0	dB
EIRP per 7 MHz channel =	60.0	60.7	dBW/7 MHz
Combined EIRP per 7 MHz channel =		N/A	dBW/7 MHz
Spreading Loss =	-162.8	-162.8	dB/m^2
BW Ratio (4kHz/ 7 MHz) =	-32.4	-32.4	dB
PFD at Receiver =	-135.2	-134.5	dBW/4kHz/m^2
Pfd (CONUS +SPOT BEAM)=		N/A	dBW/4kHz/m^2
Antenna Area =	3.4	3.4	dBm^2
Sidelobe to Mainbeam =	-25.0	-25.0	dB
Polarization Loss =	-3.0	-3.0	dB
Feeder Loss =	-2.0	-2.0	dB
Interference (I) per system =	-161.8	-161.1	dBW/4kHz
I total =		N/A	dBW/4kHz
K =	-228.6		dB/deg K/Hz
Tstd (290 deg K) =	24.6		dB deg K
KTstd =	-204.0		dB/Hz
System Noise Figure at Receiver =	3.6		dB
B (4 kHz) =	36.0		dBHz
N per 4 kHz =	-164.4	-164.4	dBW/4kHz
I/N per CONUS/SPOT BEAM =	2.6	3.3	dB
I/N total =		N/A	dB

Sorted first by receive frequency then by latitude

Table 3 I/N FOR EACH STATION

DSBC Satellite - West Longitude = 101											
Refer to Link parameters as listed in Table 2:											
Enter the following parameters: Receiver antenna gain = 32.2						Rec sidelobe ratio = -25			Ref I/N = 2.6		
CANADIAN FS STATION						US DSBC SATELLITE	OFFBORESITE	I/N RESULTS			
Station	Latitude- north deg-min- sec	Longitude- west deg-min- sec	Antenna Azimuth- degrees- decimal	Receive Antenna gain dB	Receive Frequency MHz	Azimuth from FS - degrees- decimal	Elevation from FS - degrees- decimal	Angle from FS boresite - degrees- decimal	Envelope B I/N dB	Envelope A I/N dB	FSS I/N dB
Bell Lake AB	533918	1140008	105.6	33.4	2310.25	162.02	26.86	77.26	1.5	-6.9	-15.5
White Court ? AB	540154	1154303	113.3	33.4	2310.25	164.00	27.57	71.09	2.0	-5.9	-15.6
Lemington ON	420039	823317	1.5	32.2	2311.00	227.06	25.96	127.84	-5.7	-22.1	-14.3
Watford ON	430015	814814	229.9	34.1	2311.00	224.75	22.52	64.93	4.2	-3.1	-14.6
London (Adelaide) ON	430212	811515	205.9	33.0	2311.00	227.12	26.74	56.85	3.9	-2.8	-14.6
Niagara Falls PQ	430830	790720	219.6	32.2	2311.00	226.42	26.05	61.49	2.4	-4.6	-14.8
Stratford ON	432038	810649	88.3	32.2	2311.00	224.37	23.07	91.31	-0.3	-11.2	-14.7
? ON	432139	795206	127.6	33.4	2311.00	224.76	23.89	67.38	3.1	-4.5	-14.8
Guelph ON	433549	801709	16.8	32.2	2311.00	224.76	23.89	128.38	-6.3	-22.6	-14.8
Sunderland ON	441850	790052	36.4	33.2	2311.00	225.35	26.21	120.55	-3.9	-21.8	-15.0
Petersborough ON	441945	781803	228.9	32.2	2311.00	224.06	24.86	64.65	1.8	-5.5	-15.1
Still Water Lake NS	444240	635120	252.5	32.2	2311.00	224.06	24.86	78.64	-0.6	-9.0	-16.2
Miners Bay ON	444849	784351	3.8	32.2	2311.00	223.42	24.38	131.38	-7.3	-23.0	-15.2
Covey Hill PQ	450110	734750	321.0	33.4	2311.00	223.42	24.38	120.88	-4.4	-22.2	-15.6
Covey Hill PQ	450110	734750	85.5	33.4	2311.00	224.89	26.93	92.87	0.0	-12.9	-15.5
St George NB	451015	665430	89.3	33.0	2311.00	222.81	23.37	90.82	-0.8	-11.2	-16.1
?	451619	660346	247.0	33.4	2311.00	222.81	23.37	74.78	1.0	-7.1	-16.2
Lake of Bays ON	451645	790009	228.1	33.2	2311.00	223.01	24.31	63.48	2.8	-4.4	-15.3
Mont Brume PQ	451720	723821	85.2	33.4	2311.00	208.62	30.35	93.02	-0.1	-13.1	-15.6
Mont Brume PQ	451720	723821	288.9	36.9	2311.00	207.81	31.88	103.94	2.4	-18.7	-15.6
Mont Bellevue PQ	452225	715456	255.1	33.4	2311.00	224.52	27.52	81.01	0.9	-7.7	-15.7
Bourget PQ	452748	750946	210.2	35.1	2311.00	207.81	31.88	49.53	5.8	-0.3	-12.7
St Vens Lake NS	453126	633102	333.8	32.2	2311.00	208.36	31.73	132.38	-8.5	-24.1	-16.3
Sussex New	454037	653130	243.2	33.4	2311.00	146.32	8.77	68.20	1.1	-6.4	-16.6
West Isicester NS	454612	640104	297.4	32.2	2311.00	222.21	25.90	107.83	-3.8	-24.2	-16.4
Mont Ripon PQ	454759	750945	286.2	35.1	2311.00	223.66	28.05	100.24	1.0	-20.5	-15.6
Mont Ripon PQ	454759	750945	119.7	35.3	2311.00	221.34	24.40	70.76	3.8	-4.0	-15.6
Ham-Nord PQ	455406	713418	46.3	35.3	2311.00	209.38	35.64	119.70	-2.3	-20.4	-15.7
Ham-Nord PQ	455406	713418	145.0	33.4	2311.00	214.04	31.45	54.35	3.3	-3.1	-15.7
St Calixte PQ	455938	735029	158.1	33.4	2311.00	149.92	29.08	45.86	4.2	-2.3	-13.8
St Calixte PQ	455938	735029	33.6	35.3	2311.00	214.19	31.75	125.84	-3.5	-20.3	-15.6
St Calixte PQ	455938	735029	249.9	36.9	2311.00	221.18	25.92	76.66	4.8	-3.5	-15.7

Sorted first by receive frequency then by latitude

Table 3 I/N FOR EACH STATION

DSBC Satellite - West Longitude = 101													
Refer to Link parameters as listed in Table 2:													
Enter the following parameters:		Receiver antenna gain = 32.2				Rec sidelobe ratio = -25				Ref I/N = 2.6			
CANADIAN FS STATION						US DSBC SATELLITE		OFFBORESITE		I/N RESULTS			
Station	Latitude- north deg-min- sec	Longitude- west deg-min- sec	Antenna Azimuth- degrees- decimal	Receive Antenna gain dB	Receive Frequency MHz	Azimuth from FS - degrees- decimal	Elevation from FS - degrees- decimal	Angle from FS boresite - degrees- decimal	Envelope B I/N dB	Envelope A I/N dB	FSS I/N dB		
?	459111	755102	315.4	35.3	2311.00	212.01	27.92	122.22	-2.8	-20.4	-15.7		
Lac a la Trout PQ	460018	771050	99.4	33.4	2311.00	151.50	29.44	82.61	1.0	-7.7	-15.4		
Lac a la Trout PQ	460018	771050	317.7	33.4	2311.00	212.01	27.92	123.64	-4.8	-22.1	-15.5		
Mont Alta PQ	460203	741420	244.8	32.2	2311.00	219.38	24.09	72.76	0.4	-7.5	-15.8		
Lutes Moutain NF	460943	645150	364.4	33.4	2311.00	163.66	31.16	144.72	-7.9	-22.9	-16.3		
? PQ	461637	755954	163.0	35.3	2311.00	213.13	30.82	46.15	6.2	-0.2	-11.8		
St Joseph PQ	461925	705100	156.8	32.2	2311.00	219.92	25.39	50.43	2.2	-3.9	-16.0		
Lac Baubel PQ	462808	780826	299.3	33.4	2311.00	213.13	30.82	110.57	-2.1	-22.0	-15.4		
Mont Carmel PQ	462946	723830	51.0	33.4	2311.00	219.92	25.39	115.82	-3.7	-22.5	-15.9		
Mont Carmel PQ	462946	723830	339.0	33.4	2311.00	213.13	30.82	132.14	-6.9	-22.4	-15.8		
Mont Carmel PQ	462946	723830	257.0	36.9	2311.00	219.33	24.84	80.94	4.2	-4.5	-15.9		
Saint Agapit	463343	712633	109.7	32.2	2311.00	220.12	26.70	76.45	-0.2	-8.4	-16.0		
Mont Sir Wilfrid PQ	464124	753545	28.7	33.4	2311.00	220.12	26.70	127.35	-5.8	-22.3	-15.7		
Mont Sir Wilfrid PQ	464124	753545	122.8	33.4	2311.00	219.84	27.33	68.65	2.0	-5.6	-15.7		
Mont Sir Wilfrid PQ	464124	753545	290.9	34.1	2311.00	212.90	31.08	104.59	-0.5	-21.5	-15.6		
? PQ	464700	770445	216.5	33.4	2311.00	218.20	26.60	55.59	3.3	-3.2	-15.6		
Quebec (Complex G)	464829	711304	142.4	33.7	2311.00	212.83	31.36	55.05	3.3	-3.2	-15.8		
Mont Belair	464922	712943	129.4	35.3	2311.00	218.54	28.17	64.22	4.0	-3.2	-15.9		
Mont Belair	464922	712943	22.3	36.9	2311.00	210.83	28.76	133.75	-3.9	-19.1	-16.0		
Mont Belair	464922	712943	268.5	33.4	2311.00	144.15	14.49	88.62	-0.4	-9.7	-16.3		
Ruisseau a la Scie	471317	724811	188.7	33.4	2311.00	164.20	27.15	32.33	6.4	-2.6	-10.4		
?	471516	792238	145.3	35.3	2311.00	210.83	28.76	51.96	5.7	-0.6	-13.1		
Mont Bruno PQ	471516	792238	8.0	33.4	2311.00	151.54	29.37	139.58	-7.1	-22.1	-15.5		
Mont Bruno PQ	471516	792238	77.6	33.4	2311.00	211.33	31.33	99.22	-0.5	-21.1	-15.5		
?	471539	794936	142.4	33.4	2311.00	217.53	27.36	56.37	3.4	-3.2	-15.5		
?	471539	794936	322.2	33.0	2311.00	211.54	32.09	124.80	-6.3	-23.3	-16.3		
?	471714	703923	34.6	36.9	2311.00	217.75	28.20	125.19	-2.3	-19.3	-16.2		
Lac Lavoie	471714	703923	223.1	33.7	2311.00	211.54	32.09	58.18	2.9	-3.8	-16.1		
Hermitage NF	473332	555621	289.8	32.2	2311.00	217.99	29.14	103.29	-3.9	-25.1	-17.3		
Mont Gladys	473411	711521	1.3	33.4	2311.00	210.30	30.28	138.46	-7.7	-22.7	-16.1		
Mont Gladys	473411	711521	167.6	33.7	2311.00	217.81	28.94	47.62	3.8	-2.5	-14.4		
Mont ? PQ	473458	692217	93.4	33.4	2311.00	210.31	30.27	88.16	-0.3	-9.6	-16.3		

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DSBC Satellite - West Longitude = 101											
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Enter the following parameters: Receiver antenna gain = 32.2						Rec sidelobe ratio = -25			Ref I/N = 2.6		
CANADIAN FS STATION											
Station	Latitude- north deg-min- sec	Longitude- west deg-min- sec	Antenna Azimuth- degrees- decimal	Receive Antenna gain dB	Receive Frequency MHz	US DSBC SATELLITE	OFFBORESITE	I/N RESULTS			
Mont Bleu PQ	473458	692217	229.2	35.3	2311.00	218.15	29.76	63.47	3.8	-3.4	-16.1
Parent PQ	475313	744012	205.1	33.4	2311.00	209.49	29.72	46.85	3.8	-2.6	-14.3
Lac Bachon PQ	475512	722210	20.8	33.4	2311.00	218.01	30.37	129.08	-6.6	-22.7	-16.1
Lac Bachon PQ	475512	722210	208.3	33.4	2311.00	218.15	29.76	53.10	3.0	-3.3	-15.9
Lac Bachon PQ	475512	722210	86.2	36.9	2311.00	218.77	29.07	92.63	2.9	-9.7	-16.2
?	475853	670119	332.0	33.0	2311.00	162.71	27.47	138.42	-8.6	-23.6	-16.6
St Alexis PQ	475853	670119	75.0	33.4	2311.00	217.53	27.36	100.57	-1.8	-23.2	-16.6
Louvicourt PQ	480453	772957	160.9	33.4	2311.00	216.34	28.38	48.05	3.8	-2.4	-14.5
Louvicourt PQ	480453	772943	331.0	33.4	2311.00	218.13	28.83	127.07	-5.8	-22.4	-15.8
St Medard PQ	480531	685429	39.8	33.4	2311.00	216.34	28.38	123.59	-5.8	-23.1	-16.5
St Medard PQ	480531	685429	180.0	36.9	2311.00	217.75	28.20	46.00	6.9	0.4	-11.1
St Jocques PQ	480975	651225	59.6	32.2	2311.00	217.22	30.78	110.64	-4.6	-24.5	-16.7
St Jocques PQ	480975	651225	268.8	35.3	2311.00	217.81	28.94	89.15	1.0	-8.3	-16.7
?	482508	674800	119.6	33.4	2311.00	216.66	29.74	71.02	1.0	-6.9	-16.6
Mont la Redemption	482508	674800	271.2	33.4	2311.00	217.81	28.94	90.47	-0.9	-10.8	-16.6
Ste Hedwige PQ	482821	722030	151.7	33.4	2311.00	216.66	29.74	52.13	3.0	-3.2	-15.8
Ste Hedwige PQ	482821	722030	321.0	33.4	2311.00	163.57	28.09	131.10	-7.1	-22.9	-16.3
St Honore MCQ PQ	482827	710602	190.4	36.9	2311.00	216.15	29.18	45.78	7.0	0.5	-11.0
St Honore MCQ PQ	482827	710602	54.5	33.4	2311.00	216.13	27.89	112.26	-3.4	-23.0	-16.4
?	482912	784621	97.0	33.4	2311.00	214.57	27.80	85.32	0.4	-8.6	-15.8
Mont Abjevis PQ	482912	784621	204.7	36.9	2311.00	167.49	24.46	36.21	9.0	1.0	-8.0
Cap Des Ros/Crs PQ	485002	641530	178.3	33.4	2311.00	166.20	31.96	34.67	4.9	-3.5	-12.0
Cap Des Ros/Crs PQ	485002	641530	314.4	33.4	2311.00	210.18	32.03	120.84	-5.6	-23.5	-16.9
Castagnier PQ	485017	775616	64.7	36.9	2311.00	216.00	31.55	107.56	1.5	-19.0	-15.9
?	485747	701818	67.7	33.4	2311.00	210.90	34.10	106.15	-2.2	-23.0	-16.4
Courval PQ	485747	701818	223.8	33.4	2311.00	215.50	30.71	59.65	2.1	-4.8	-16.5
Mount Miller PQ	485756	652843	76.0	33.4	2311.00	210.16	33.81	101.43	-2.0	-23.4	-16.8
Mount Miller PQ	485756	652843	277.6	33.4	2311.00	215.02	30.84	95.44	-1.5	-17.5	-16.8
Chigoubiche PQ	490628	732905	121.4	33.4	2311.00	233.63	20.31	73.71	0.8	-7.3	-16.5
?	490628	732905	310.2	35.3	2311.00	213.25	27.39	118.57	-2.8	-21.1	-16.4
Morden MB	491103	980036	68.2	34.5	2311.00	208.62	30.35	105.97	0.8	-20.0	-14.5
Surrey BC	491108	1225100	167.3	32.2	2311.00	214.04	31.45	46.35	4.1	-2.3	-14.0

Sorted first by receive frequency then by latitude

Table 3 I/N FOR EACH STATION

DSBC Satellite - West Longitude -101											
Refer to Link parameters as listed in Table 2:											
Enter the following parameters: Receiver antenna gain = 32.2						Rec sidelobe ratio = -25			Ref I/N = 2.6		
CANADIAN FS STATION											
Station	Latitude- north deg-min- sec	Longitude- west deg-min- sec	Antenna Azimuth- degrees- decimal	Receive Antenna gain dB	Receive Frequency MHz	Azimuth from FS - degrees- decimal	Elevation from FS - degrees- decimal	Angle from FS boresite - degrees- decimal	Envelope B I/N dB	Envelope A I/N dB	FSS I/N dB
Mount Cours PQ	491320	654536	217.8	35.3	2311.00	151.50	29.44	52.82	4.2	-2.1	-14.7
Mt Horne BC	491720	1244200	232.1	33.4	2311.00	221.18	25.92	65.25	3.4	-3.9	-14.7
?	492212	763756	55.5	33.4	2311.00	209.62	33.48	114.53	-3.6	-22.7	-16.1
?	492212	763756	227.3	33.4	2311.00	219.38	24.09	61.38	2.2	-4.8	-16.2
Bower Island	492235	1232335	116.7	36.9	2311.00	210.02	34.40	73.63	6.3	-1.7	-14.3
Bowen Island BC	492235	1232335	116.7	32.2	2311.00	219.33	24.84	73.81	1.4	-6.7	-14.7
Bowen Island BC	492235	1232335	116.7	32.2	2311.00	210.42	35.55	73.99	1.6	-6.5	-14.5
Prevert PQ	492328	672833	111.1	36.9	2311.00	219.84	27.33	75.67	3.8	-4.4	-16.8
Prevert PQ	492328	672833	257.3	33.4	2311.00	208.36	31.73	80.48	-0.1	-8.7	-16.8
?	492735	1232319	167.7	33.7	2311.00	218.54	28.17	49.19	5.2	-0.9	-13.2
Caoeette PQ	492846	683209	244.2	35.3	2311.00	208.36	31.73	70.96	2.7	-5.1	-16.7
Caquette PQ	492860	683209	129.5	32.2	2311.00	216.34	28.38	63.89	0.2	-7.0	-16.8
Caquette PQ	492860	683209	334.4	33.4	2311.00	149.40	28.43	133.05	-8.0	-23.4	-16.8
Steinbach MB	493650	963940	311.8	32.2	2311.00	217.22	30.78	117.11	-3.9	-22.5	-14.7
Lethbridge AB	494252	1135315	87.4	34.8	2311.00	222.21	25.90	92.13	2.2	-9.7	-14.7
Mt Washington BC	494515	1251730	6.2	32.2	2311.00	156.86	29.85	145.09	-7.5	-22.5	-14.7
?(Posie) PQ	494926	752818	97.3	32.2	2311.00	221.35	24.41	85.23	-1.4	-10.4	-16.4
?(Posie) PQ	494926	752818	243.0	33.2	2311.00	214.57	27.80	70.62	1.0	-6.8	-16.3
Grassy Lake AB	495031	1113748	83.6	34.8	2311.00	220.04	22.12	94.65	1.9	-13.1	-14.8
Penicoh PQ	495208	670400	35.6	33.4	2311.00	215.50	30.71	124.67	-6.4	-23.5	-16.9
Port MilnerPQ	495220	641216	201.3	33.4	2311.00	221.11	24.98	50.51	2.2	-3.9	-16.4
Black Knight Mtn BC	495238	1191821	263.6	32.2	2311.00	213.25	27.39	84.52	0.3	-8.6	-14.7
Pentecote PQ	495248	670400	200.5	35.3	2311.00	151.50	29.44	44.24	5.0	-1.6	-12.8
Mont Bourbeau PQ	495646	742059	241.8	33.4	2311.00	221.11	24.98	71.02	1.0	-6.8	-16.5
Mont Bourbeau PQ	495646	742059	166.7	35.3	2311.00	208.74	35.57	46.29	5.4	-1.0	-12.6
Black Tusk BC	495905	1230322	196.7	32.2	2311.00	219.93	25.39	49.11	3.6	-2.6	-14.8
Selkirk MB	501202	965030	22.8	34.7	2311.00	207.79	36.13	131.41	-4.3	-20.0	-14.7
Parkland AB	501458	1134200	154.2	34.4	2311.00	218.20	26.60	51.06	5.5	-0.6	-13.1
Vernon Hill BC	501558	1191126	215.8	36.4	2311.00	207.74	36.48	54.72	7.4	0.9	-11.7
Nouvet PQ	501618	684642	177.1	36.9	2311.00	159.70	27.16	33.86	8.6	0.0	-8.3
Nouvel PQ	501618	684642	0.5	33.4	2311.00	207.04	36.72	135.69	-8.3	-23.3	-16.7
Havre St Pierre PQ	501619	634051	271.2	36.9	2311.00	156.60	30.21	90.87	2.0	-8.5	-17.2

Sorted first by receive frequency then by latitude

Table 3 I/N FOR EACH STATION

DSBC Satellite - West Longitude = 101											
Refer to Link parameters as listed in Table 2:											
Enter the following parameters: Receiver antenna gain = 32.2				Rec sidelobe ratio = -25				Ref I/N = 2.6			
CANADIAN FS STATION				US DSBC SATELLITE				OFFBORESITE			
Station	Latitude- north deg-min- sec	Longitude- west deg-min- sec	Antenna Azimuth- degrees- decimal	Receive Antenna gain dB	Receive Frequency MHz	Azimuth from FS - degrees- decimal	Elevation from FS - degrees- decimal	Angle from FS boresite - degrees- decimal	Envelope B I/N dB	Envelope A I/N dB	FSS I/N dB
Riviere Au Bouleau	501732	653145	90.9	32.2	2311.00	168.67	28.57	89.68	-2.5	-11.9	-17.1
Riviere Au Bouleau	501732	653145	261.7	36.9	2311.00	215.50	30.71	84.14	2.7	-6.2	-17.1
Lemay PQ	510052	682741	14.0	32.2	2311.00	172.85	30.14	146.88	-9.8	-24.8	-17.0
Lemay PQ	510052	682743	202.4	33.4	2311.00	219.40	23.21	48.99	2.4	-3.8	-16.0
Gagnon PQ	515444	680651	49.2	33.4	2311.00	206.49	37.97	117.87	-5.3	-23.7	-17.1
Saskatoon SK	520750	1063922	24.3	36.4	2311.00	216.13	27.89	130.75	-2.9	-18.8	-15.2
? PQ	524656	671226	188.3	33.4	2311.00	216.00	31.55	47.15	2.3	-4.1	-15.9
Warburg AB	530556	1141615	85.0	33.1	2311.00	213.71	29.37	94.08	-0.2	-14.5	-15.3
Lloydminster AL	531535	1100720	288.3	35.1	2311.00	163.30	31.68	104.77	0.8	-20.2	-15.3
Hilton AB-NW36	532142	1173146	43.1	33.1	2311.00	216.66	29.74	121.33	-4.6	-22.3	-15.4
Entwistle AB	533341	1150321	181.2	34.8	2311.00	185.69	32.95	33.51	8.1	-0.6	-8.7
? AB	540428	1135415	172.3	35.3	2311.00	185.41	32.33	33.74	8.5	-0.2	-8.4
Tar Island AB	565952	1113230	162.2	32.2	2311.00	183.95	33.50	37.87	3.7	-3.8	-13.3
? NT	622727	1333903	348.7	33.4	2311.00	152.12	28.98	139.37	-8.8	-23.8	-17.2
Tuktoyaktuk NT	692409	1325725	331.8	33.4	2311.00	152.08	29.81	132.48	-9.7	-25.2	-18.6
Bell Lake AB	533918	1140008	285.9	33.4	2313.25	164.00	27.57	103.42	-0.9	-22.1	-15.5
Chatham ON	422342	821251	240.8	32.2	2317.00	217.29	29.92	70.31	2.1	-5.7	-14.3
Chatham ON	422342	821251	240.6	32.2	2317.00	181.51	32.39	65.49	2.6	-4.8	-14.3
Saint Johns NF	451619	660340	39.0	32.2	2317.00	215.29	30.18	122.81	-6.4	-23.9	-16.1
Mont Brome PQ	451720	723821	323.3	33.1	2317.00	167.33	28.52	133.39	-7.2	-22.5	-15.6
Joliette Tel	460125	732524	279.4	33.1	2317.00	146.32	8.77	98.11	-1.4	-20.6	-16.1
Nicolet (Poste)	460455	721512	114.3	35.3	2317.00	139.69	14.71	72.38	3.2	-4.7	-16.1
Nicolet (Pos1e)	460455	721512	96.0	33.4	2317.00	206.77	37.47	85.81	0.5	-8.5	-15.6
Saint Zenon	463420	734745	276.4	33.1	2317.00	206.77	37.47	94.50	-0.6	-15.4	-15.6
Mont Sir Wilfrid	464124	753545	94.3	33.1	2317.00	165.92	28.24	86.81	0.1	-9.0	-15.7
Rousseau a la Scie	471317	724811	7.7	33.4	2317.00	166.13	26.27	149.96	-7.6	-22.6	-16.0
Mt McDonald BC	482630	1233400	96.0	32.2	2317.00	215.97	30.50	87.38	0.4	-8.7	-14.4
Castagnier PQ	485017	775616	165.3	33.4	2317.00	216.15	29.18	47.43	3.8	-2.5	-14.4
Aldergrove BC	490318	1222930	355.2	32.2	2317.00	217.22	30.78	132.52	-6.8	-22.3	-14.5
Wellington Radio BC	491250	1240012	330.0	36.4	2317.00	217.29	29.92	126.66	-1.5	-18.2	-14.6
Burnaby BC	491329	1225918	55.7	32.2	2317.00	209.49	29.72	114.89	-3.3	-22.4	-14.6
Agassiz BC	491500	1214448	216.9	32.2	2317.00	164.81	27.85	46.96	4.0	-2.4	-14.2

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Table 3 I/N FOR EACH STATION

DSBC Satellite - West Longitude = 101											
Refer to Link parameters as listed in Table 2:											
Enter the following parameters:	Receiver antenna gain = 32.2					Rec sidelobe ratio = -25			Ref I/N = 2.6		
CANADIAN FS STATION						US DSBC SATELLITE	OFFBORE SITE	I/N RESULTS			
Station	Latitude-north deg-min-sec	Longitude-west deg-min-sec	Antenna Azimuth-degrees decimal	Receive Antenna gain dB	Receive Frequency MHz	Azimuth from FS - degrees decimal	Elevation from FS - degrees decimal	Angle from FS boresite - degrees decimal	Envelope B I/N dB	Envelope A I/N dB	FSS I/N dB
Prevert PQ	492328	672833	45.3	33.4	2317.00	142.46	16.11	123.07	-6.3	-23.7	-17.1
Campbell Mountain BC	493018	1193243	195.9	33.2	2317.00	213.13	30.82	46.24	5.0	-1.4	-13.0
Minnedosa MB	501552	995013	138.7	33.4	2317.00	219.40	23.21	58.19	3.8	-2.9	-14.9
Vernon Hill BC	501559	1191126	347.3	32.2	2317.00	221.11	24.98	131.74	-7.0	-22.7	-14.9
Sicamous BC	505115	1185833	248.8	32.2	2317.00	156.20	30.51	94.73	-0.7	-15.8	-14.9
Calgary Campus Tower	510500	1140739	276.0	32.2	2317.00	163.31	30.21	95.06	-0.8	-16.3	-14.9
Main Brook (?)	511105	580134	57.6	33.4	2317.00	150.72	29.39	113.89	-5.2	-24.4	-17.8
Sharples AB	512840	1130328	235.5	32.9	2317.00	162.02	26.86	61.43	2.8	-4.2	-15.1
Gagnon PQ	515444	680651	193.9	33.4	2317.00	157.30	29.33	38.85	3.4	-3.9	-13.6
Buffalo Creek AB	531020	1111150	272.8	33.5	2317.00	230.09	19.08	91.60	0.2	-11.2	-15.6
Poe AB SE 35 49	531620	1122200	300.8	33.5	2317.00	151.93	29.72	54.36	3.8	-2.6	-15.3
Sherwood Park AB	532940	1131854	220.5	33.5	2317.00	224.52	27.52	61.26	3.1	-3.9	-15.5
White Court Mtn AB	540154	1154303	302.6	33.0	2317.00	160.53	25.96	117.07	-4.0	-22.6	-15.6
Smoky Well AB	542340	1181730	302.8	33.0	2317.00	159.05	25.96	116.95	-4.1	-22.7	-15.7
Iosegun AB	543849	1170500	276.9	33.0	2317.00	152.47	30.05	95.35	-0.8	-16.6	-15.6
Breynat AB	550824	1122718	110.7	34.8	2317.00	150.95	30.27	74.64	2.9	-5.2	-15.7
Carcross Central Off	600908	1344107	296.3	33.0	2317.00	153.43	30.10	111.24	-4.0	-23.7	-16.7
Haines Junction YT	604511	1373037	2.5	33.0	2317.00	156.86	29.85	137.81	-8.9	-23.9	-16.9
Tuktoyaktuk NT	692409	1325725	215.0	35.3	2317.00	164.73	30.00	46.81	3.1	-3.3	-15.1
Delacour AB	510910	1134735	226.6	32.9	2322.00	163.75	30.20	55.23	3.6	-3.0	-14.9
Delacour AB	510910	1134735	226.6	32.9	2322.00	163.75	30.20	55.23	3.6	-3.0	-14.9
Wimborne AB	515425	1133538	158.7	32.9	2322.00	164.15	29.45	39.02	5.1	-2.2	-12.0
Vulcan AB	502247	1132209	161.3	33.0	2322.25	163.36	30.26	38.72	5.6	-1.8	-11.5
Calgary AB 909	510234	1140450	142.1	33.0	2322.25	163.36	30.26	49.42	4.2	-1.9	-14.3
Calgary AB 909	510234	1140502	142.1	33.0	2322.25	163.36	30.26	49.42	4.2	-1.9	-14.3
Calgary AB 909	510234	1140502	142.1	33.0	2322.25	163.36	30.26	49.42	4.2	-1.9	-14.3
Calgary AB 909	510234	1140450	142.1	33.0	2322.25	164.11	31.08	49.66	4.2	-1.9	-14.3
Burlington ON	432139	795206	290.8	32.2	2323.00	162.71	27.47	107.45	-2.0	-22.5	-14.7
Chicoutimi R R PQ	482258	710553	39.1	33.4	2323.00	162.64	28.76	128.71	-6.7	-23.0	-16.4
Mont Abijevis PQ	482912	784621	214.4	33.4	2323.00	162.71	27.47	45.64	4.0	-2.4	-13.9
Duncan BC	484650	1234336	346.6	32.2	2323.00	160.73	30.26	140.44	-7.3	-22.3	-14.5
Mt Sicker BC	485138	1234520	120.4	32.2	2323.00	162.70	27.64	64.95	2.4	-5.0	-14.5

Sorted first by receive frequency then by latitude

Table 3 I/N FOR EACH STATION

DSBC Satellite - West Longitude = 101											
Refer to Link parameters as listed in Table 2:											
Enter the following parameters:	Receiver antenna gain = 32.2				Rec sidelobe ratio = -25				Ref I/N = 2.6		
CANADIAN FS STATION						US DSBC SATELLITE	OFFBORESITE	I/N RESULTS			
Station	Latitude-north deg-min-sec	Longitude-west deg-min-sec	Antenna Azimuth-degrees decimal	Receive Antenna gain dB	Receive Frequency MHz	Azimuth from FS - degrees-decimal	Elevation from FS - degrees-decimal	Angle from FS boresite - degrees-decimal	Envelope B I/N dB	Envelope A I/N dB	FSS I/N dB
Abbotsford BC	490337	1222056	118.0	32.2	2323.00	164.81	27.85	67.09	2.1	-5.4	-14.6
Vancouver BC	491356	1230120	353.2	32.2	2323.00	164.81	27.85	147.73	-7.4	-22.4	-14.6
Port Alberni Co	491500	1244808	218.2	33.2	2323.00	156.20	30.51	51.91	4.5	-1.7	-14.2
Campbell Mountain BC	493018	1193243	281.0	32.2	2323.00	209.38	35.64	98.09	-0.7	-19.8	-14.5
Campbell Mountain BC	493018	1193243	348.8	33.2	2323.00	151.90	29.70	138.73	-6.4	-21.4	-14.6
Radium Hot Springs	503723	1160708	141.7	33.2	2323.00	152.64	30.09	52.91	4.2	-2.1	-14.7
Fly Hill RF Repeater	504352	1192655	183.9	33.4	2323.00	156.69	29.32	37.12	6.3	-1.5	-10.7
Adams Hill BC	505407	1193820	144.8	33.4	2323.00	217.57	27.44	52.91	4.3	-2.1	-14.6
Lausseedat PQ	520732	675914	62.6	33.4	2323.00	156.51	29.10	111.74	-4.3	-23.9	-17.3
Rocky Mountain House	522004	1145352	73.2	35.3	2323.00	219.46	22.98	101.86	1.3	-20.0	-15.3
Poe AB SE 35 49	531620	1122200	102.8	33.5	2323.00	156.20	30.51	80.08	1.4	-7.1	-15.4
Drayton Valley AB	532349	1150225	117.8	35.1	2323.00	208.62	30.35	69.72	4.0	-3.7	-15.4
Sherwood Park AB	532940	1131854	289.2	33.5	2323.00	149.79	29.08	104.55	-0.9	-21.9	-15.4
Sherwood Park AB	532940	1131854	98.7	33.5	2323.00	165.92	28.24	82.67	1.1	-7.7	-15.4
Entwistle AB	533341	1150321	82.0	36.4	2323.00	150.88	29.81	96.43	2.8	-14.4	-15.4
Entwistle AB	533341	1150321	82.0	34.8	2323.00	150.89	29.89	96.45	1.2	-16.0	-15.4
Athabasca AB	545452	1125131	159.5	30.6	2323.75	165.61	26.45	35.08	3.1	-5.2	-13.8
Athabasca AB	545452	1125131	159.5	30.6	2323.75	165.61	26.45	35.08	3.1	-5.2	-13.8
Calgary AB	510234	1140450	151.1	30.6	2325.00	163.36	30.26	44.32	2.3	-4.3	-14.9
Calgary AB	510234	1140450	151.4	30.6	2325.00	163.75	30.20	43.99	2.3	-4.3	-14.9
Delacour AB	510910	1134735	54.4	32.9	2325.00	163.75	30.20	119.27	-3.9	-22.0	-14.9
Delacour AB	510910	1134735	54.4	32.9	2325.00	163.36	30.26	119.19	-3.9	-22.0	-14.9
Lethbridge ALTA 410	494215	1125005	306.8	33.0	2325.25	164.64	31.89	119.40	-3.5	-21.6	-14.6
Vulcan AB	502247	1132209	163.7	33.0	2325.25	164.11	31.08	38.08	5.7	-1.8	-11.3
White Rock BC	490231	1224900	343.9	36.4	2330.75	152.92	30.11	137.31	-3.1	-18.1	-14.5
Sumas Peak BC	490707	1220752	293.9	34.8	2330.75	151.50	29.48	107.98	0.7	-19.7	-14.5
Surrey BC	490902	1224528	327.7	35.4	2330.75	151.80	29.62	130.23	-3.2	-19.2	-14.6
Vancouver BC	491710	1230719	58.2	30.6	2330.75	152.18	29.87	109.65	-3.9	-24.0	-14.6
Bowen Island BC	492043	1232309	88.2	34.8	2330.75	152.07	29.95	90.20	2.6	-7.0	-14.6
Pender Island BC	484702	1231758	262.4	32.2	2335.00	151.40	30.04	84.81	0.6	-8.4	-14.5
Ladysmith BC	490116	1234921	141.1	32.2	2335.00	150.86	29.63	52.90	3.5	-2.8	-14.5
Sumas Peak BC	490707	1220752	206.8	21.1	2341.25	151.91	29.67	47.58	-7.1	-13.4	-14.5

Sorted first by receive frequency then by latitude

Table 3 I/N FOR EACH STATION													
CANADIAN FS STATION						US DSBC SATELLITE		OFFBORESITE			I/N RESULTS		
Station	Latitude-north deg-min-sec	Longitude-west deg-min-sec	Antenna Azimuth-degrees-decimal	Receive Antenna gain dB	Receive Frequency MHz	Azimuth from FS - degrees-decimal	Elevation from FS - degrees-decimal	Angle from FS boresite - degrees-decimal	Envelope B I/N dB	Envelope A I/N dB	FSS I/N dB		
Burnaby BC	491600	1230112	26.0	21.1	2341.25	152.92	30.11	128.38	-17.1	-33.5	-14.6		
Beauceville (Tel)	461350	704538	313.5	27.3	2348.25	155.06	20.70	125.28	-11.9	-28.8	-16.1		
Beauceville (Tel)	461350	704538	148.0	27.3	2348.25	218.91	29.11	55.62	-3.1	-9.6	-15.9		
Muskwa BC	584409	1224050	0.0	10.0	2348.25	218.91	29.11	132.83	-31.0	-46.5	-16.5		

Table 5

Summary of Canadian MAT Frequency Assignments
(All Frequencies in MHz)

Cold Lake AL	2330	--	--	2348A	2352	2365	2360A&B
Suffield AL	2330	--	2345A	--	--	--	2360A&B
Wainwright AL	2330	--	--	2348B	--	--	2360A&B
Shilo MA	2330	--	--	2348B	--	--	2360A&B
Petawawa ON	2330	--	--	2348B	--	--	2360A&B
Val Cartier QU	2330	--	--	2348A	--	--	2360A&B
Gagetown NB	2330	--	2345A	2348B	--	--	2360A&B
Inside Passage BC -	...	2335	2345B	--	2353	--	--

Freq. **Emission Desig.**

2345A	500 kHz
2345B	6.0 MHz
2348A	1.5 MHz
2348B	500 kHz
2360A	4.0 MHz
2360B	14.6MHz

Attachment A

Rather than recalculate Table 2 for each station, the reference I/N was used as a baseline. The value in each of the I/N results columns was then determined as follows: (1) the starting I/N value was 2.6 dB from Table 2, (2) the antenna gain and sidelobe to mainbeam values (32.2 and -25 dB) from Table 2 was subtracted, (3) the specific antenna gain from the Canadian table TEST2.DBF was added, (4) the calculated sidelobe performance for each antenna type was added, (5) a range loss variation factor was added, and (6) a DSBC CONUS beam rolloff factor was added.

To obtain the sidelobe performance, the angle between the radio relay antenna pointing vector and the vector to the satellite was then calculated. From this angle and the performance standards in proposed SRSP 302.29 and ITU-R standards, the sidelobe performances were determined for each station.

The DSBC CONUS beam rolloff is 0.2 dB for every degree of latitude the FS station is north of the Canadian border. The border is simulated by the 49 degree north latitude west of 98 degree west longitude. East of the 98 degree west longitude, the border is assumed to be a straight line from a point 49 degree north and 98 degree west and extended through New York City. This approximates the -2 dB line of the antenna pattern figure 1-11 of the DSBC filing.